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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,254	07/23/2003	Wolfgang Singer	637.0031USX	3188
7590 08/10/2004				
CHARLES N.J. RUGGIERO, ESQ. OHLANDT, GREELEY, RUGGIERO & PERLE, L.L.P. 10th FLOOR ONE LANDMARK SQUARE STAMFORD, CT 06901-2682			EXAMINER LEYBOURNE, JAMES J	
			ART UNIT 2881	PAPER NUMBER

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,254

Applicant(s)

SINGER ET AL.

Examiner

James J. Leybourne

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18-26, 29 and 30 is/are rejected.
- 7) ☒ Claim(s) 12-16, 27 and 28 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 072303.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

On page 7, line 20, "200" should be "20°".

On page 7, line 31, "160" should be "16°".

On page 7, line 31, "80" should be "8°".

On page 8, line 16, "200" should be "20°".

On page 8, line 18, "800" should be "80°".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-10,18,19, 22, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sweatt et al. (USPN 6285737).

In Fig. 1, Sweatt et al. disclose a condenser system, for use with a ringfield camera in projection lithography. The collector comprises a grazing incidence mirror array C1 that receives light from a source **22** for illuminating an image side plane **70**. Fig. 2A shows that the mirror array comprises a set of nested mirror shells that are rotationally symmetric about a common axis. Each of the reflector shells defines a ring aperture element of the object-side aperture. As seen in Fig. 2A, the ring elements essentially adjoin one another continuously such that the gap between beams is small. The rings are approximately equidistant from the source and therefore the irradiances are about equal.

As shown in Fig. 2A, the edges of each mirror define a beam and, collectively, these beams define a region through which the light passes. On the non-reflecting side of each mirror, in the region between the shells, there is a stiffener ring (column 9, lines 33-41). A support device for supporting mirror shells is inherent. This component does not have an optical effect because it is not in the region defined by the beams, i. e. it is in the gap between the beams. For supporting the shells, it would be obvious to one of ordinary skill in the art to attach the support structure to the stiffening rings using a radial (spoke) connecting element.

The mirrors can have a parabolic or hyperbolic mirror cross-section (column 8, lines 60-64).

4. Claims 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sweatt et al. as applied to claim 1 above, and further in view of Kumakhov (USPN 5192869). Kumakhov discloses a lens with a plurality of

rotationally symmetric reflector shells. He teaches that for deflecting mirrors the photon intensity is so large that absorption of even a small fraction of incident photons will result in heating and can produce large thermal gradients with accompanying mechanical stress and deformation (column 16, lines 11-22). It would be obvious to one of ordinary skill in the art that, for applications where the reflectors need to be cooled, the , condenser system of Sweatt et al. could be modified by adding a channel for coolant in the region not used by the light because Kumakhov teaches cooling can be achieved by passing a fluid (liquid or gas) coolant between the lens elements. It would be obvious to one of ordinary skill in the art to position the coolant supply in a region near the support device.

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sweatt et al. as applied to claim 1 above, and further in view of O'Hara (USPN 5682415). Sweatt et al. do not teach using angles of incidence $< 20^\circ$. It is known in the art that for short wavelengths the reflectivity depends strongly on the angle of incidence. O'Hara disclose a reflector for x-ray beams and teaches using grazing angles between 1 to 6 degrees at x-ray energies from 500-2000 eV. it would be obvious to one of ordinary skill in the art to choose an angle of incidence to give high reflectivity and that for some wavelengths, this would require angles of less than 20 degrees as taught by O'Hara.

6. Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sweatt et al. as applied to claim 1 above, and further in view of Komatsuda (EP 0939341 A2). In Fig. 13, Komatsuda discloses an illumination and exposure apparatus that uses an optical integrator **220** comprised of elements **220a** and

220b that each have a plurality of raster elements, as shown in Fig. 15. With reference to Fig. 17, the light beam is condensed by elements **220a** to form a light source image in plane P_{Fo} [0064]. The apparatus of Komatsuda further comprises optical elements, 64 and 68, which focus the light on, mask M_F [02073].

It would be obvious to one of ordinary skill in the art to modify the system of Sweatt et al. to include an optical integrator with raster elements, as taught by Komatsuda because Komatsuda teaches that light reflecting from each element is superimposed on the mask, allowing uniform illumination to be achieved [0037].

Allowable Subject Matter

7. Claims 12-16 and 27-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

8. Regarding claims 12-16, the prior art fails to disclose or make obvious a collector as cited in claim 1, wherein at least one of said first and second mirror shells includes a first segment having a first optical surface and a second segment having a second optical surface.

Regarding claims 27 and 28, the prior art fails to disclose or make obvious an illumination system as cited in claim 26 further comprising a diaphragm positioned in or near the intermediate image, that separates the illumination system into a first space and a second space, wherein said first space includes said light source and said collector.

Relevant Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

The following patents are cited to show further show the state of the art with respect

US 20040130694 to Kurt et al. uses Wolter reflectors in a grazing incidence collector for a lithographic projection apparatus.

USPN 5002379 to Murtha teaches a nested shell collector with radial supports (Fig. 21).

Conclusion

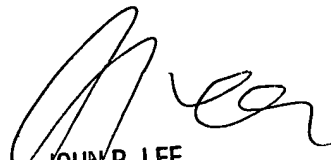
Any inquiry concerning this communication or earlier communications from the examiner should be directed to James J. Leybourne whose telephone number is (571) 272-2478. The examiner can normally be reached on M-F 9:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

August 1, 2004

JJL


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